Draft Feb 9, 2009

red/bold words need imho immediate attention/ discussion/ clarification

Agreement of Cooperation

between

The **High Energy Physics Division of Argonne National Laboratory**, 9700 S. Cass Avenue, 60439 Argonne, USA, hereafter referred to as **ANL**, represented by its Director

and

The **Particle Physics and High-energy Astrophysics Division of the Max Planck Institute for Nuclear Physics,** Saupfercheckweg 1, 69117 Heidelberg, Germany, hereafter referred to as **MPIK**, represented by its Director

and

Deutsches Elektronen-Synchrotron, Notkestr 85, 22607 Hamburg, Germany, hereafter referred to as **DESY**, represented by its boards of Directors,

hereafter individually or collectively referred to as the “Party” or “Parties”, respectively.

It has been agreed to cooperate in a project to

Design and construct mechanical structures with drive systems for ground-based Imaging Atmospheric Cherenkov Telescopes (IACTs) designed to measure high-energy gamma-rays covering energies above a few tens of GeV with large sensitivities.

1. Project description

The purpose of the cooperation laid out in this Agreement is to design IACT prototypes, in particular the optical support structures and both the mechanical and electrical parts of the drive system both of small- and mid-size (six and twelve meter-class) telescopes. The telescopes shall be usable for CTA, the Cherenkov Telescope Array within its current baseline design but allow also to investigate alternative designs to increase the sensitivity. For a large system of IACTs reliability and efficient production and commissioning of the telescope structures are even more important than for previous IACTs. The design of the telescopes must be optimized in terms of their construction cost, making best use of the economics of large-scale production. Key goals in the next years are detailed designs and (industrial) cost estimates for telescopes. We will make use of the large base of know-how available in construction and operation of H.E.S.S. and VERITAS telescopes and possibly in related areas of the engineering of large antenna.

2. Time schedule

An approximate time schedule is:

- **end of 2009 design a small- and mid-size conventional prototype telescope**
- **2009 design a mid-size secondary-mirror telescope**
- **2009 build a drive system test-stand**
- **2010 build, with industrial partners, small- and mid-size conventional prototypes with drive systems**

3. Expertise and man-power

MPIK designed and built together with industrial partners the H.E.S.S.1 telescopes in the years **2000 to 2006**. The **highest priority of MPIK in 2009** is to finish the construction of the H.E.S.S. 2 telescope that was designed under the supervision of MPIK – and to start operating it in 2010. **One**

mechanical engineer of the group is designated to the design of small and mid-size telescopes for CTA. **The coordinating physicist works closely with the engineer.**

DESY started only recently to build up expertise in telescope building. **One mechanical engineer** is working on a design for a mid-size telescope for CTA with help and in close collaboration with ANL. DESY plans to build, with industrial partners, a mid-size telescope prototype. Furthermore, DESY takes responsibility for design and building the electrical drive and control system of the prototype telescopes as one of the key systems for a save and robotic operation of the telescopes. More than one electrical engineer is assigned to this task. **The coordinating physicist works closely with the engineers.**

The Mechanical Support Group (MSG) of ANL consists of a staff of engineers, designers, engineering assistants, and technicians who design and construct experimental components and the equipment. In recent years the Mechanical Support Group has participated in the construction of Zeus, CDF, the ATLAS Tile-calorimeter, the STAR detector at RHIC, and the Near and Far Detectors at MINOS. The MSG has a wide range of technical skills such as the ability to perform detailed finite element analysis, solid modeling, detailed design drafting, fiber optic experience, mechanical fabrication, mechanical testing of materials and structures, and designing of machinery. **One mechanical engineer** of the MSG worked in the last two years on telescope designs with a secondary mirror for mid-size telescopes. Recently the group started to work with DESY on the design of a 'conventional' mid-size telescope. ANL can contribute with **up-to ??? experts from MSG** to offer technical assistance; this man-power will spur the design process of prototype telescopes with the goal of building such prototypes of different sizes together together with MPIK and DESY and industrial partners. **The coordinator is the manager of the MSG.**

4. Consultancy and technical assistance

Subject to the availability of appropriate ANL experts, ANL shall use its know-how, equipment and man-power to provide, on a 'best effort' basis, consultancy and technical assistance of the design of the other Parties needs. For the service agreed, ANL shall give an estimate of the costs, based on written requests by the other Parties and obtain the other Parties written clearance before commencing work.

5. Payment conditions

DESY and MPIK shall pay the following fees for technical assistance of ANL experts: **400** (four hundred) EUR per day. The total sum of these fees shall not exceed **30,000** (thirty thousand) EUR per year. On the basis of the time spent on technical assistance and the costs incurred ANL will issue one or more invoices which DESY and MPIK shall pay into the accounted state on the invoice within 30 days of the issuance of said invoice. In addition, the costs of subsistence of ANL experts for trips to Europe may be reimbursed by MPIK and DESY on the basis of the rates of MPIK and DESY. Travel costs will be covered by the Parties themselves.

6. Exchange of knowledge

Each Party shall make available to the other Parties, free of charge, in writing or in any other appropriate form, its existing intellectual property, whether protected or not, for the exclusive purpose of its use, by the other Parties only, under this Agreement.

The providing Parties provide no warranty, including but not limited to those of fitness for purpose and non-infringement of intellectual property rights held by third parties, in respect of intellectual property made made available by it or the other Parties under this Agreement, and the receiving Party shall hold the providing Party free and harmless from any liability arising from its use (including, if permitted, any sub-licensing) of such intellectual property.

7. Confidentiality

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8. Intellectual property rights

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9. Disputes

The Parties shall do their utmost to settle amicably any differences and difficulties which may arise during the cooperation.

10. Changes

Changes to this Agreement and all amendments have to be agreed upon in writing and shall be signed by all Parties.

11. Duration and Termination

The cooperation is established when this Agreement has been signed by all Parties. This Agreement will initially last till December 31, 2010, but can be extended if the Parties wish so.

12. Coordination

The overall project coordination will be agreed upon by all Parties. All Parties prepare regular coordination meetings at least one in six month to control and adjust the work progress and time schedule of the project. Protocols of these meetings will be made available within ten working days after the meetings. Nominated coordinators of the cooperation within this Agreement are V. Guarino for ANL, M. Panter for MPIK and S. Schlenstedt for DESY.

Argonne, _____ 2009	Heidelberg, _____ 2009	Hamburg, _____ 2009
On behalf of ANL	On behalf of MPIK	On behalf of DESY
Prof. H. Weerts Director of HEP Division	Prof. W. Hofmann Director	Prof. H. Dosch Chair of the Directorate
	Dr. Günter Sparn Representative of the Board of Directors	C. Scherf Director of Administration
		Dr. U. Gensch Representative of the Directorate in Zeuthen
V. Guarino Coordinator	Dr. M. Panter Coordinator	Dr. S. Schlenstedt Coordinator